



Dear customer, congratulations for your choice, a Trimos measuring instrument. Over more than 30 years, our products have built up an excellent reputation in terms of quality, accuracy and longevity. In order to get also an entire satisfaction of the present product, we recommend to read carefully this user's manual.

Version 1.2 / 2002-08

User's manual

MESTRE

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1 Safety regulations

1.1 Important information

In order to prevent any damages due to a wrong manipulation, please read carefully the following instructions. TRIMOS will not assume any responsibility in case of damages caused by inadequate use which is not in line with the present manual.

1.2 Symbols used

The following symbols are used in this manual :



General warning, utilization advices



Risk of electric shock



Electrostatic protection

1.3 General warnings



Protection against electrostatic interferences:

The static electricity can damage the electronic components of the instrument. In order to prevent this type of damages, avoid any contact with the connector pins.



Switch on the power supply :

The instrument should be switched on only when the electrical connections have been completed correctly.



In order to prevent any changes of the instrument performance or any accident, the instrument should never be dismantled.



The electronic display unit incorporates high voltage components. If, for any reason, the electronic unit needs to be opened, only authorized personnel is allowed to do it.



Do not expose the instrument, its components and accessories to rain or any projection of fluids. Avoid penetration of foreign substances into the connectors and the instrument openings.



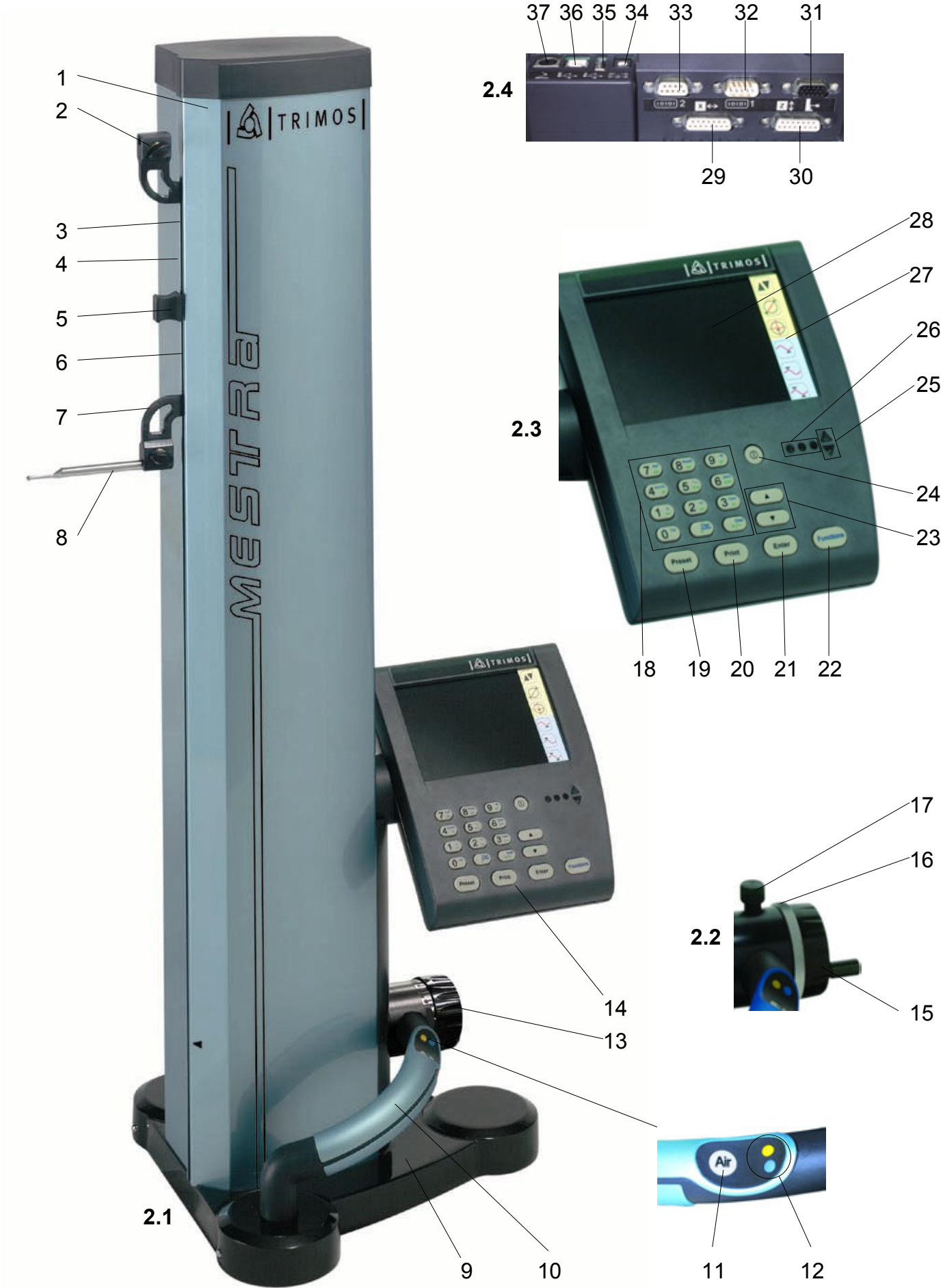
In case of problems with the instrument or any of its parts (no display, overheating, anomalous smell, ..), switch off the instrument immediately and disconnect the power supply. Please contact your local TRIMOS agent.



This is a high accuracy instrument. Particular care should be taken during its entire operational lifetime. Care mainly about the following specific points:

- Use the instrument on a stable, smooth and clean surface plate.
- Avoid any shock to prevent the characteristic features of the instrument from loosing its performances.
- Use the instrument in a vibration free area.
- Avoid the exposure to direct sunlight and excessive humidity.
- Avoid the proximity of heating or air conditioning systems.
- Respect the indicated environmental conditions.

2 Instrument description






















2.1 Instrument construction

1. Column
2. Upper measuring insert holder
3. Screw for the adjustment of the floating probe suspension
4. Transport safety screw for locking of the probe suspension (chromium plated)
5. Lever for fast displacement of the measuring carriage (only on manual version)
6. Screw for the measuring force adjustment
7. Lower measuring insert holder
8. Measuring insert
9. Base with air cushion system for instrument displacement
10. Operating handle for the displacement of the instrument
11. Press button to activate the air cushion
12. Programmable function keys
13. Handwheel for measuring carriage displacement and probing movement (motorized version)
14. Display unit (see details here-after)










2.2 Handwheel for measuring carriage displacement and probing (manual version)

15. Handwheel for measuring carriage displacement and probing movement (manual version)
16. Locking device to activate the fine adjustment
17. Fine adjustment screw

2.3 Display unit

18.  Selection of references / numeric display of **7** / alphanumeric display of **a b c**
18.  Selection of resolution / numeric display of **8** / alphanumeric display of **d e f**
18.  Storage of probe constant / numeric display of **9** / alphanumeric display of **g h i**
18.  Selection of measuring unit (mm/inch) / numeric display of **4** / alphanumeric display of **j k l**
18.  Min, max or delta mode/ numeric display of **5** / alphanumeric display of **m n o**
18.  Zero setting of the display / numeric display of **6** / alphanumeric display of **p q r**
18.  Squareness deviation checking / numeric display of **1** / alphanumeric display of **s t u**
18.  Angle measurements / numeric display of **2** / alphanumeric display of **v w x**
18.  Selection of the calculation mode / numeric display of **3** / alphanumeric display of **y z**
18.  Selection of the tolerance limits mode / numeric display of **0**
18.  Complete clearing of the buffer / decimal point display
18.  Clears the last value stored in the buffer / change of sign
19.  Sets the display to the previously input preset value of the current reference
20.  Print-out of data
21.  Confirmation of selected or input data
22.  Selection of main functions
23.  Displacement of the cursor to the previous field
23.  Displacement of the cursor to the following field
24.  On/Off key (power ON / OFF)
25. Probe setting direction indicator
26. Green light : measurement in specified tolerances
Red light : measurement out of specified tolerances
Orange light: measurement out of specified tolerance, but the part can be retouched.
27. Menu of functions
28. Display (touch screen for models Vectra-Touch and Mestra-Touch)

2.4 Interfaces/connectors

29.  X axis (electronic probe for checking of squareness deviation, horizontal)
30.  Z axis (vertical)
31.  "Instrument" connector
32.  RS 232 male
33.  RS 232 female
34.  AC adaptor connection
35.  USB A
36.  USB B
37.  Foot pedal connection

3 Getting started

3.1 Packing list

The standard supply of the instrument includes the following items:

1. Instrument



2. Display unit



3. Ac adaptor



4. Power supply cable



5. Measuring insert, tungsten carbide ball, Ø 4 mm



6. Setting gauge



7. Protection cover



8. Allan key 2 mm



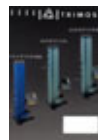
9. Allen key 5 mm



10. 2 screws (to fix the display unit)



11. User's manual



12. Electric connexion diagram



13. Test certificate



14. Certificate of guarantee



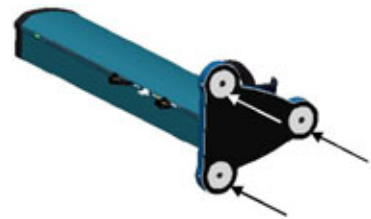
When unpacking, carry the instrument by the operating handle and the column. For future transports, keep the original packaging.

If the instrument has been stored at a temperature below 5°C, wait a few hours before unpacking to prevent the instrument parts from condensation. Condensation can affect sensitive parts of the instrument.

3.2 Setting up

After unpacking, prepare the instrument as follows :

1. Clean the air cushion pads positioned underneath the base using a clean fabric, slightly soaked with alcohol.



2. Position the instrument with care on a clean measuring plate.



3. Mount the display unit using the 2 screws (allen key 6 mm).

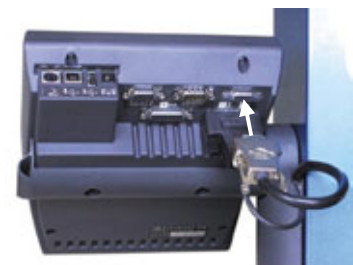


Static electricity can damage the electronic components of the instrument. In order to prevent this type of damages, avoid any contact with the connector pins.

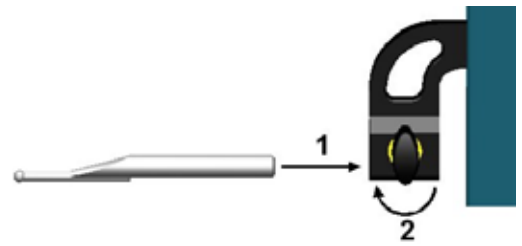
4. Connect the measuring system to the display unit.



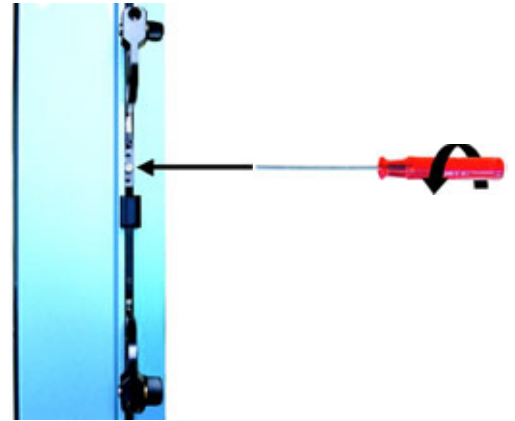
5. Connect the functional system to the display unit.



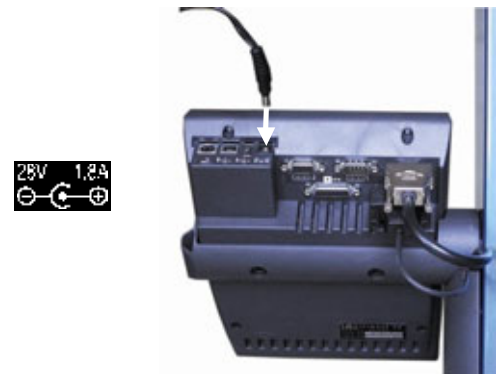
6. Slide the measuring insert into the holder (1) and lock it using the knob (2).



7. Release the transport safety screw (chromium-plated).



8. Charge the batteries. Connect the AC adaptor to the instrument and the power supply . After connection of the AC adaptor, the instrument will switch ON automatically, even if it has been switched off. The level of the battery charge is indicated on the screen (see § 10.4). A complete empty battery pack needs about 3 hours to be fully charged.



Do not connect the charging before all other electrical connections have been performed. See above explanation.

To be able to optimise the operational lifetime of the battery pack and to obtain an optimum power capacity, it is imperative to perform at least 5 complete charging cycles when using the instrument initially.

It is not necessary to wait until the batteries are fully charged. The instrument is immediately operational after connection of the AC adaptor.

It is not dangerous to leave the AC adaptor constantly connected.

4 Getting started

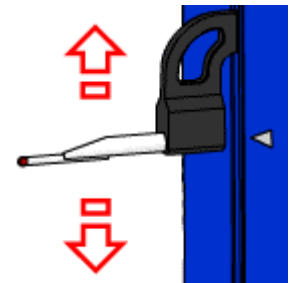
4.1 Setting into operation

The section § 10 will give you detailed information.

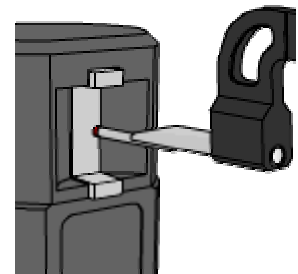
1. To switch on the instrument, press the **On/Off** key.
To switch it off, press the same key (> 2 sec.).




2. The display will ask for the reference. Move the measuring carriage slowly until the small triangular reference symbol has been passed. An acoustic signal will confirm that the reference has been detected and the display starts counting.
If the display does not start counting, repeat the sequence.



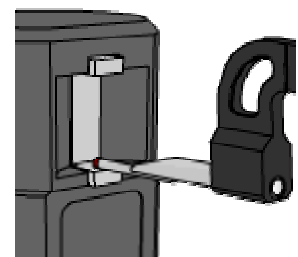
3. The instrument is now asking for the probe constant. This function compensates the dimension and the deflexion of the measuring insert when probing downwards and upwards (reversed surfaces, diameters). Position the measuring insert between the two surfaces of the setting gauge. Do not move the instrument and the setting gauge any more.



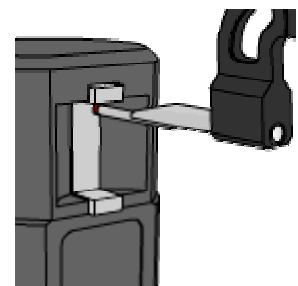
Note:

This procedure may be interrupted by pressing . The last stored probe constant value will then be considered.

4. Position the insert on the lower surface of the gauge using the handwheel for the displacement, engage the measuring force until confirmation of measurement by the green direction arrow and a simultaneous acoustic signal.



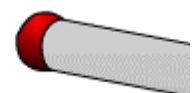
5. Without moving any part (instrument and gauge), move the measuring insert towards the top and perform the same sequence on the upper surface of the setting gauge.



6. Repeat the sequences 4 and 5 one more time. This allows to determine the measurement uncertainty based on the type of the measuring insert used. The resolution of the display will automatically be adapted to the measurement uncertainty.

2 x

7. The probe constant will be displayed on the screen and stored into the buffer (CST).
The instrument is now ready for use.

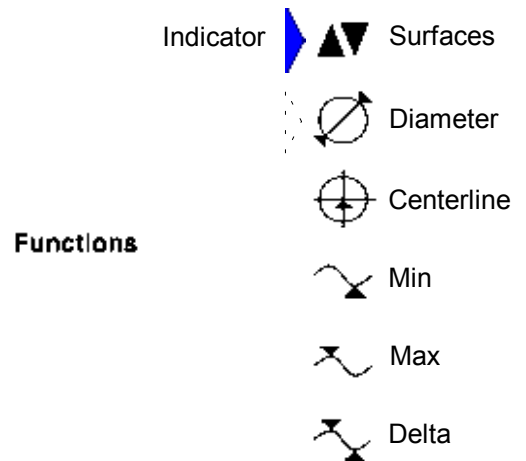


The probe constant needs to be checked and stored again after each measuring insert change, after change of its position in the holder, after each adjustment of the measuring force or adjustment of the floating probe suspension.

5 Basic functions

5.1 Selection of surface / diameter and centerline distance measurements

To select the functions of surface measurements or diameter/centreline distances, press the **Functions** key. The pointer, situated at the left side of the menu symbols, indicates the selected function. The Min, Max and Delta modes will be explained later on.



5.2 Surface measurements

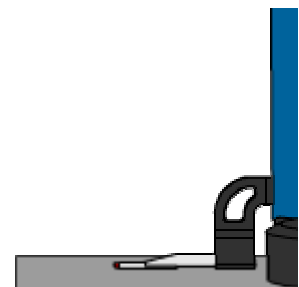
1. After having switched on the instrument, it is set to surface measuring mode. If not, press the **Functions** key until the pointer is next to the symbol for surface measurements.
2. Set the display at zero or at a preset value with the measuring insert probing a reference surface (see § 6.1 and § 6.6).

Position the insert on the reference surface, engage the measuring force until confirmation of measurement by the green direction arrow and a simultaneous acoustic signal. Press **Zero** or **Preset** key.

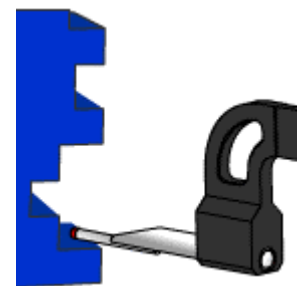
Functions



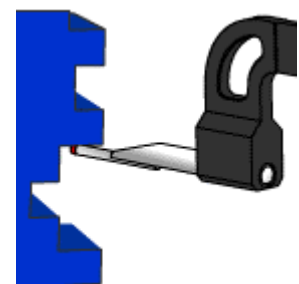
6 ^{Zero}
_{pqr}
or
Preset



3. Set the measuring insert on the lower or upper surface, engage the measuring force until confirmation of measurement by the green direction arrow and a simultaneous acoustic signal. The result will be displayed and stored into the buffer (SUR).



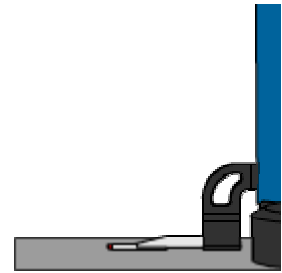
or



5.3 Diameter and centerline distance measurements

1. Set the display at zero or at a preset value on a reference surface (see § 6.1 and § 6.6).

6 ^{Zero}
_{pqr}
or
Preset



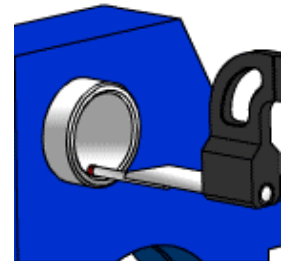
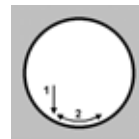
2. Select the diameter / centerline mode by pressing the **Functions** key (the pointer must be situated next to the corresponding symbol).

Functions



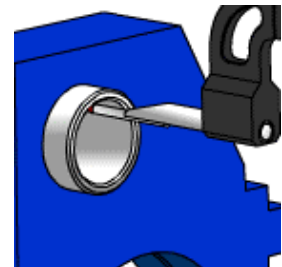
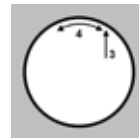
3a. **Internal diameter:**

Position the measuring insert into the bore and set it off center on the lower profile (1). Engage the measuring force until confirmation of the measurement by the green direction arrow and a simultaneous acoustic signal. Move the instrument (or the part) laterally to determine the reversal point (2). The reversal point is stored automatically.



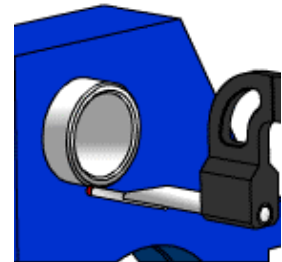
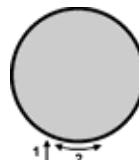
Note: The probing indicator (at the left side of the digital display) must always be in the green zone when searching for the reversal point.

- 4a. Move the measuring insert straight up and set it on the upper profile (3). Engage the measuring force until confirmation of the measurement by the green direction arrow and a simultaneous acoustic signal. Move the instrument (or the part) laterally to determine the reversal point (4). The diameter value is displayed.

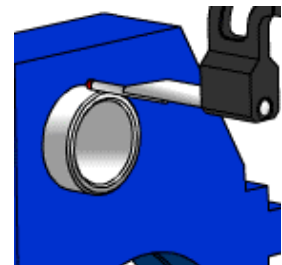


3b. **External diameter:**

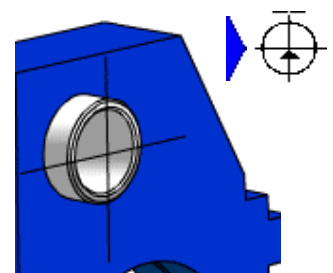
Set the measuring insert off center under the lower profile (1). Engage the measuring force until confirmation of the measurement by the green direction arrow and a simultaneous acoustic signal. Move the instrument (or the part) laterally to determine the reversal point (2). It is automatically stored. Remove the measuring insert slowly to the side, off center.



- 4b. Set the measuring insert off center top of the upper profile (3). Engage the measuring force until confirmation of the measurement by the green direction arrow and a simultaneous acoustic signal. Move the instrument (or the part) laterally to determine the reversal point (4). The diameter value is displayed.



5. Remove the measuring insert. The function pointer moves automatically to the centerline symbol and the value of the centerline will be displayed. Both values, diameter and centreline distance, are memorized and displayed in the buffer (DIA and CEN). A zero setting or a preset value can be assigned to the centreline.

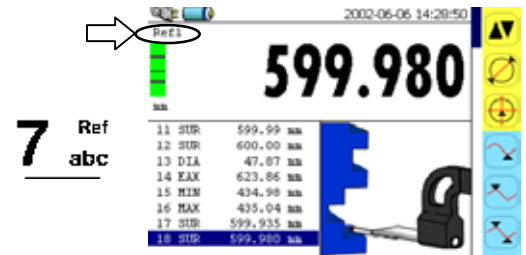


6 Secondary functions

6.1 References

6.1.1 Selection of references

4 references are available on the display unit. The activated reference is indicated above the probing indicator. To change a reference, press the **Ref** key. Each change of a reference is displayed in the buffer (REF #).



6.1.2 Assignment of a preset value to a reference

By pressing the **Preset** key, a previously entered preset value (or zero setting) will be assigned to the selected reference (1 to 4).

A preset value can be entered on a surface or centerline distance measurement.

A preset value can be assigned to each reference. Select the required reference, press the **Preset** key longer than 2 seconds. Enter the value and confirm by pressing the **Enter** key.

Preset

Preset

> 2 sec.

Enter



6.2 Selection of the resolution

To modify the display resolution press the **Resol** key.

8 Resol
def

6.3 Setting / memorizing of the probe constant

To check and memorize the probe constant, press the **↔** key and follow the same sequence than for "Setting into operation" (§ 4.1, points 3 to 7).

Note:

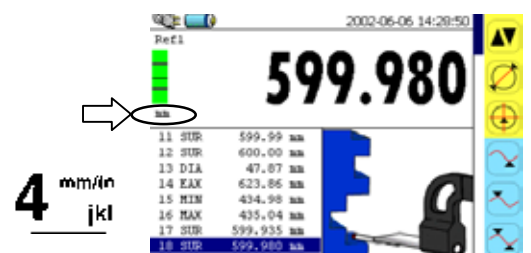
By pressing once the **↔** key, the current value of the probe constant will be displayed (or a new one can be entered). By pressing the same key a second time, the probe constant setting mode will be interrupted and the display will automatically switch back to normal surface measuring mode.

9 ↔
ghi



6.4 Selection of the measuring unit: mm/inch

Measurements can be performed either in mm or in inch. To change the unit, press the **mm/in** key. The active unit is displayed below the probing indicator. It is possible to lock in the required measuring unit (§ 8)



6.5 Measuring in Min / Max / Delta mode



The measurements in mode Min, Max Delta have always to be done with the probe being in contact with the surface.

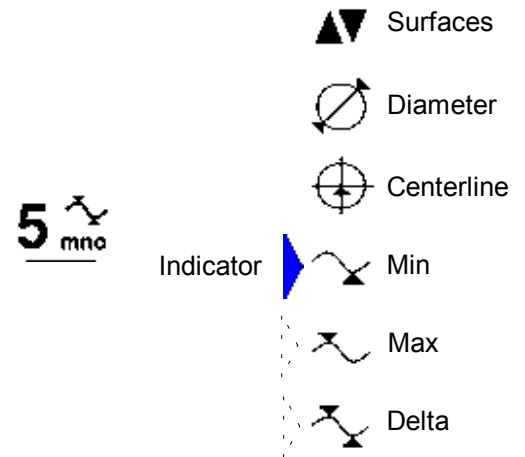
It allows you to determine the following values:

Min: Minimum value of the measured surface

Max: Maximum value of the measured surface

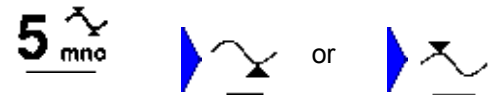
Delta: Difference between the maximum and minimum value

To select the measuring mode Min, Max or Delta, press the key . The pointer on the right of your display will indicate which function is active. You can pass from one function to the other by pressing the key .



6.5.1 Measuring in Min or Max mode

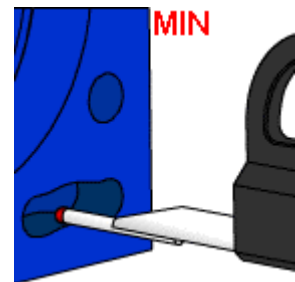
1. Select the Min or Max mode. An indication of "MIN" or "MAX" is displayed at the right side of the shown graphic.



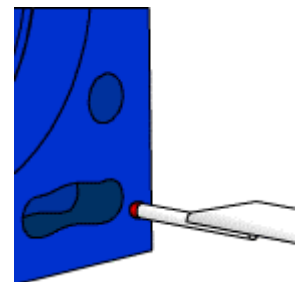
2. Set the measuring insert on the surface to be checked and move the instrument (or the part) along the required section.

Note:

By pressing the **Zero** key, a minimum or a maximum value will be reset and the actual carriage position value will be displayed.



3. After the measuring insert has been removed, the minimum or maximum value will be stored and displayed in the buffer (MIN or MAX). A new measurement can than be performed.



6.5.2 Measuring in Delta mode

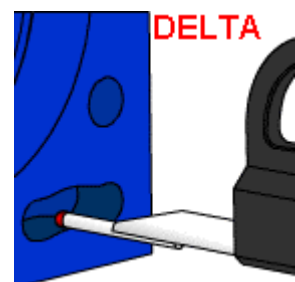
1. Select the Delta mode. An indication of "DELTA" is displayed at the right side of the shown graphic.



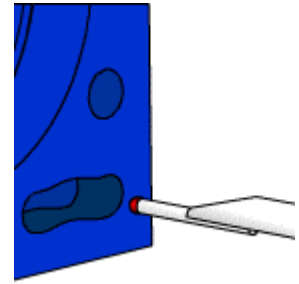
2. Set the measuring insert on the surface to be checked and move the instrument (or the part) along the required section.


Note:

By pressing the **Zero** key, the Delta mode will be reset and the display will show zero.



- After the measuring insert has been removed, the flatness value (Delta = maximum - minimum) will be stored and displayed in the buffer (DLT). A new measurement can then be performed



As long as the measuring insert is in contact with the surface, the Min / Max or Delta mode can be selected by pressing the  key. The corresponding values will be displayed.

6.6 Zero setting of the display

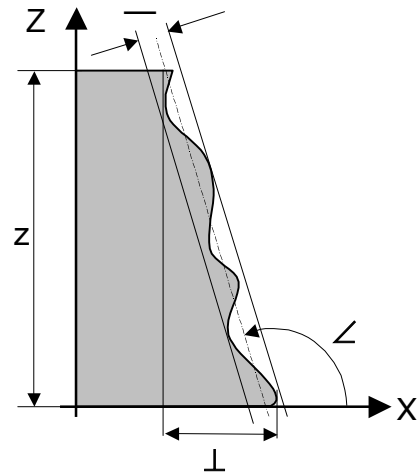
A zero setting of the display (for surface measurements or on centerline distances) is made by pressing the **Zero** key.

6 Zero
pqr

6.7 Checking of squareness deviation

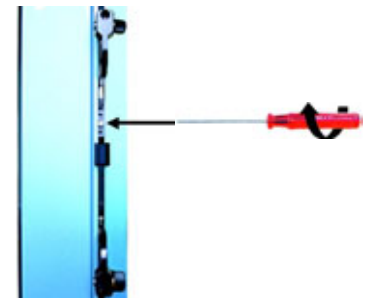
The checking of the squareness deviation includes 4 values as shown on the displayed schema:

- z** Distance
- ⊥** Squareness deviation
- ∠** Inclination
- Rectilinearity



Squareness deviation checking is done as follows:

- Lock the floating probe movement (chromium-plated screw).



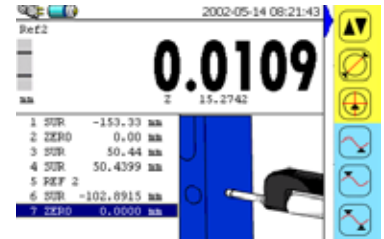
- Insert the TRIMOS electronic probe with its support (1) into the probe holder location bore and lock it using the knob (2).



3. Connect the electronic probe to the display unit.



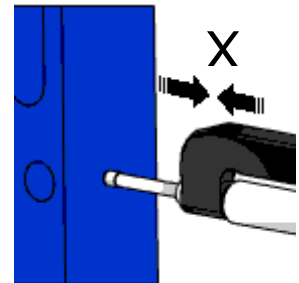
4. Activate the corresponding mode by pressing the \perp key. The value of the X axis (probe) is displayed in large fat digits and the value of the Z axis (vertical displacement) in small digits below the X axis value.



Note:

If no probe is connected, "Error X" will be displayed.

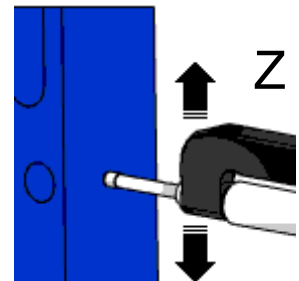
5. Position the part to be checked against the electronic probe and make sure that a contact is guaranteed over the entire measuring range. Move the measuring carriage to its starting position.



6. Set the display at zero by pressing the **Zero** key.



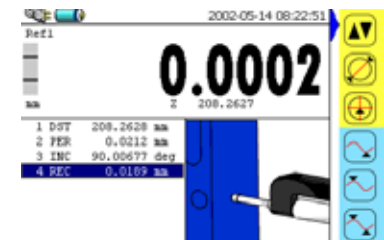
7. Move the probe slowly along the surface to be checked. During this motion, the Z axis values (vertical) and the X axis values (horizontal) are displayed constantly in direct.



8. The checking completed, press the **Enter** key to calculated the **squareness deviation**, the **inclination** and the **rectilinearity**. All values are stored and displayed in the buffer as follows:

| | | |
|-------------------|-----------------------------|-----|
| z | Distance | DST |
| \perp | Squareness deviation | PER |
| \sphericalangle | Inclination | INC |
| — | Rectilinearity | REC |

Enter




It is possible to perform more squareness deviation measurements at once by repeating the procedure from point 5 to 8.



As the squareness deviation of the instrument is electronically compensated, the mentioned deviations must be checked using the Trimos electronic probe. It is not possible to check squareness deviations using a test indicator or any other system. As an option (on request), we propose instruments where the squareness deviation has been adjusted mechanically.

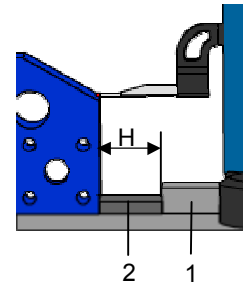
6.8 Angle measurements

This function allows to measure an angle in relation to a reference surface (measuring plate). To perform this measurement, a parallel bar and a gauge block are needed.

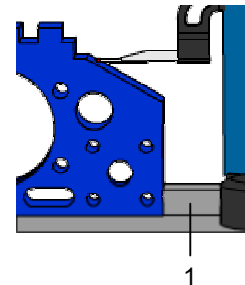
1. Activate the corresponding mode by pressing the  key.

2  VWX

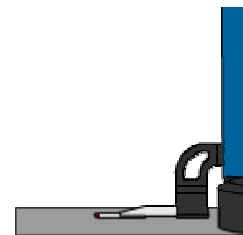
2. Perform the first measurement using the parallel bar (1) and the gauge block (2) as indicated on the screen.



3. Perform the second measurement with the parallel bar as indicated on the screen (remove the gauge block).



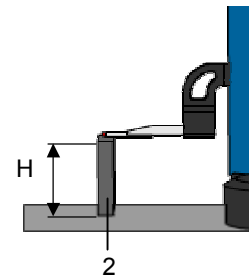
4. Remove the parallel bar and take a measurement on the reference plate.



5. The last necessary value is the one of the gauge block (2).

Note:

The height of the gauge block can be stored in the parameter set-up of the instrument (see § 8). Then, the measurement of step 5 is not necessary.



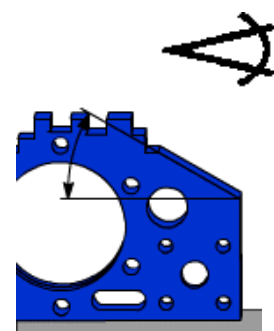
6. The value of the angle is displayed and stored in the buffer (ANG). A new angle measurement can be than performed.

Note:

The angle values can be displayed in three different unit types:

1. Decimal degrees ($x.x^\circ$)
2. Degrees, minutes, seconds ($x^\circ x' x''$)
3. Radians (rad)

The selected angle unit type is indicated above the current measured value. To change the angle unit, refer to § 8.



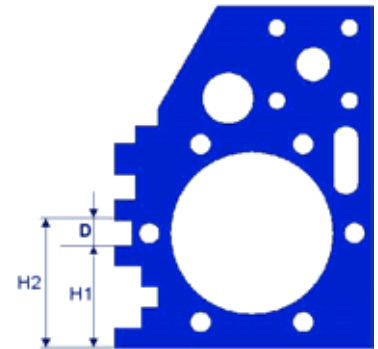
6.9 Difference between 2 measurements

The **Calc** mode allows to calculate the distance between the last 2 surface or centerline distance measurements. To be able to use this mode, perform at least 2 surface measurements or 2 centerline distance measurements.

Difference between 2 surfaces

1. Perform the measurements of surfaces H1 and H2.
2. Press the **Calc** key.
3. The difference between H1 and H2 (**D**) will be displayed and stored in the buffer.

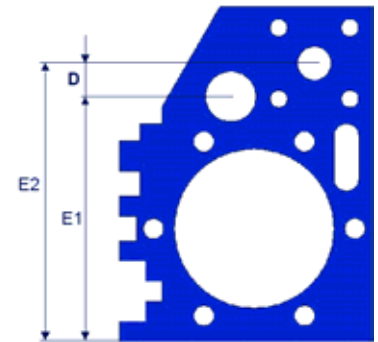
3 Calc
yz



Difference between 2 centerline distances

1. Perform the measurement of centerline distances E1 and E2.
2. Press the **Calc** key
3. The difference between E1 and E2 (**D**) will be displayed and stored in the buffer.

3 Calc
yz



When calculating the difference, the instrument will take all available digits into consideration (= maximum resolution). When the maximum resolution is not in use, the result can differ of one digit in reference to the subtraction of the displayed values (rounding off error).

Example: Max resolution = 0.0001: 10.0054 – 5.0045 => **Calc** displayed 5.0009
 Same calculation with resolution = 0.001: 10.005 – 5.005 => **Calc** displayed 5.001!

6.10 Tolerance limits mode

The **Tol** mode allows to measure parts in series and to compare the measured surface, diameter and centreline distance values to the previously entered tolerance limit values. The tolerance position is indicated by luminous LED's.

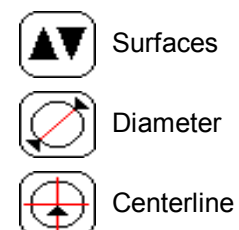
6.10.1 Programming of tolerance limit values

1. Activate the tolerance input mode by pressing the **Tol** key longer than 2 seconds. The menu will be displayed.

0 Tol
> 2 sec.



2. Use the cursor keys for selection of the required field to activate the tolerance input mode (surface, diameter or centerline distance).

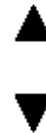


- To activate a tolerance input mode, press the **Enter** key. The fields at the right side of the symbol will than be activated.
To cancel the mode, press the **Enter** key again.

Enter



- Recall the active fields using the cursor keys. Enter the nominal size and the corresponding tolerance limits (numerical key pad).



- Once the values entered, press the **Enter** key longer than 2 seconds to quit menu.

Enter

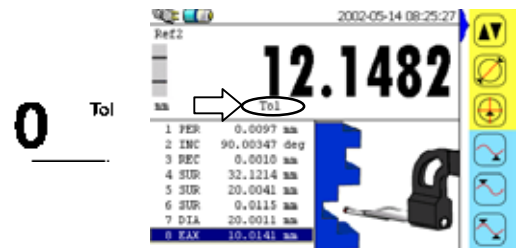
> 2 sec.

6.10.2 Application of the tolerance limits mode

- To activate the tolerance mode, press the **Tol** key. The text "Tol" appears above the current measuring value. To cancel this mode, press the **Tol** key again.

Note:

If no tolerance has been entered, it is impossible to activate this mode.

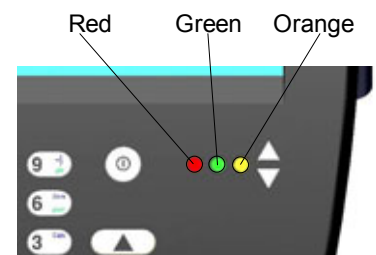


- For each surface, diameter or centerline distance measurement of which the tolerance limits mode has been activated, luminous LED's will indicate the tolerance position.

Red LED : Out of tolerances, rework of the part not possible

Green LED : In tolerances

Orange LED : Out of tolerances, possibility to rework the part



6.11 Complete clearing of the buffer

To clear the contents of the buffer completely, press the **Clear buffer** key longer than 2 seconds.

Clear buffer

> 2 sec.

6.12 Clearing of the last displayed value in the buffer

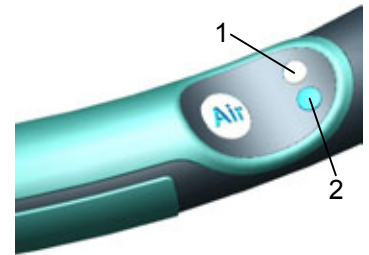
After each measurement, the value will be stored in the buffer. To clear always the last value, press the **Clear** key.



7 Programmable function keys

The operating handle of the instrument includes one key to activate the air cushion displacement of the instrument (**Air**) and 2 programmable function keys, one yellow key (1) and one blue key (2). The pre-programmed functions of this 2 keys are as follows :

1. Yellow key: **Preset**
2. Blue key: **Functions**



Other functions can be allocated to these keys, see § 8.

8 Configuration (Set-up)

Certain parameters of the instrument can be configured according to the user requirements. To open this Set-up menu, press the **Functions** key longer than 2 seconds.

The cursor keys allow the selection of the different elements in the menu. The yellow arrow indicates the cursor position.

The **Enter** key allows to activate / cancel the configuration fields.

For selection of the next page, press the **Functions** key,

To quit the Set-up menu, press the **Enter** key longer than 2 seconds.

Page 1

1. Locking of the measuring unit (mm or inch):
By activating one or the other field, the **mm/inch** key will be locked in for one or the other measuring unit. The instrument display will then only work in the selected unit.
2. Height of the setting gauge :
If another setting gauge than the supplied one will be used, it is possible to enter its height. The checking and storage of the constant must always be done between 2 inverted surface without moving the instrument or the reference gauge.
3. Angle unit format:
x.x°: Decimal degrees
x° x' x": Degrees, minutes, seconds
rad: Radians
4. Height of the gauge block for measuring angles:
By activating the required field, the last 2 steps of the angle measurement will be cancelled. The height of the gauge block will be taken over.

Functions

> 2 sec.



Enter

Functions

Enter

> 2 sec.



Page 2

5. Date:
y: year (4 numbers).
m: month
d: day

6. Time:
h: hours
min: minutes
s: seconds

7. Contrast / luminous power:
Move the indication cursor using the key 4 or 6 to change the contrast / luminous power of the screen.

8. Adjustment of the air cushion (instrument displacement):
The pressure of the air cushion can be adjusted according to the quality of the measuring plate. Move the indication cursor using the keys 4 or 6.

9. Adjustment of operating standby mode:
Activation and setting of the period of time for the standby mode.
If the instrument is not in use during the entered period of time, it passes into standby mode (display unit turned off) and the energy consumption is reduced to a minimum. This status is confirmed by a red LED. The instrument will start as soon as a movement is detected or a key is touched. The memory of the buffer will be maintained. If the entered value is equal to 0, the mode will be cancelled.

10. Adjustment of the switch Off period:
Activation and setting of the period of time before instrument switches Off completely. Enter the period of time.
After switching completely Off and On again, the memory of the buffer will be cleared but all parameter settings are maintained. If the entered value is equal to 0, the mode will be cancelled.



4 mm/in
jkl

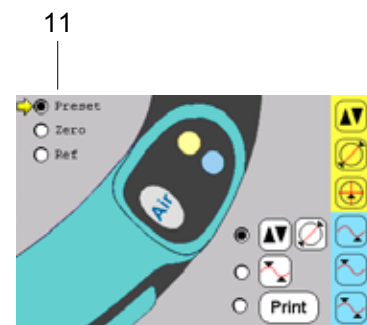
6 Zero
pqr

Page 3

Programming of the operating handle mode keys:

11. Functions of the yellow key:
Three possible functions: - Preset
- Zero
- Ref

12. Functions of the blue key:
Three possible functions: - Surfaces / Diameters
- Min / Max / Delta
- Surfaces / Min / Max



9 Data communication

9.1 Data transfer

All parameters for the data communication with the instrument are defined in the Print menu. To open this menu, press the **Print** key longer than 2 seconds. The selection and activation of the different menu elements is done the same way than described for the configuration menu.

Print
> 2 sec.

To cancel the Print menu, press the **Enter** key longer than 2 seconds.

Enter
> 2 sec.

RS 232 N°1

The interface connection for data transfer is the D-Sub connector, 9 poles, male (RS 232 N° 1, see § 2 Nb 32). It is conform to the OptoRS standards and allows the connection to external instruments as printer or computer.



Data transfer:

- Speed: **4800 baud**
- ASCII code: **7 bits**
- Parity: **even**
- Stop bits: **2**
- Handshake: **without**

Print menu

1. Transfer of the entire buffer after pressing the **Print** key
Data format (point 2)
2. Transfer of the actual value (see point 4)
The value will be transferred in ASCII code:

9 9 9 - F F F F - 9 9 9 9 . 9 9 9 9 - U U C R

A
B
C
D

- A:** Numbering of measurements
- _:** Space
- B:** Measuring mode
- :** Sign -; no space between the sign and the value
The + sign is replaced by a space
- C:** At the right side aligned numerical value according to resolution
The missing digits at the left side are replaced by spaces.
- D:** Measuring unit (**mm** or **in**)

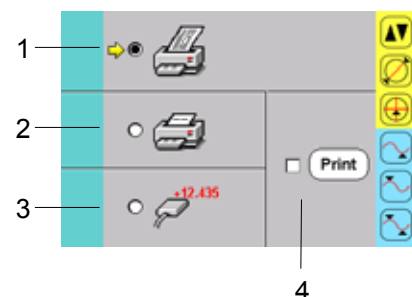
3. Transfer of numerical values only (see point 4)

The value will be transferred in ASCII code:

- 9 9 9 9 . 9 9 9 9 C R

- No space between the sign and the value
- The + sign is replaced by a space.

4. Automatic transfer or by pressing the **Print** key :
If the corresponding field has been activated, the values are transferred only when the **Print** key will be pressed. If not, the values will be transferred automatically after each measurement.



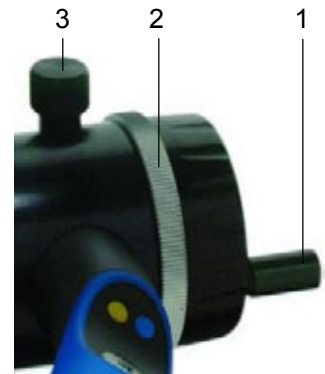
10 Application and adjustments

10.1 Application of the manual and the motorized handwheel

Manual handwheel

The manual handwheel embodies 3 functions:

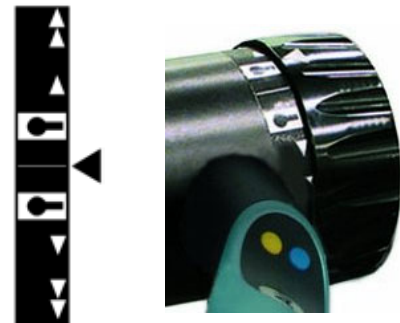
- Displacement of the measuring carriage (1).
- Locking device (2) for the fine adjustment movement and to keep a connected probe in position.
- Fine adjustment screw (3) for a precise displacement of the measuring carriage.



Motorized handwheel

The displacement of the measuring carriage is done by a rotating movement of the handwheel (max. $\pm 60^\circ$). The measuring carriage speed is proportional to the rotation. 4 zones are available:

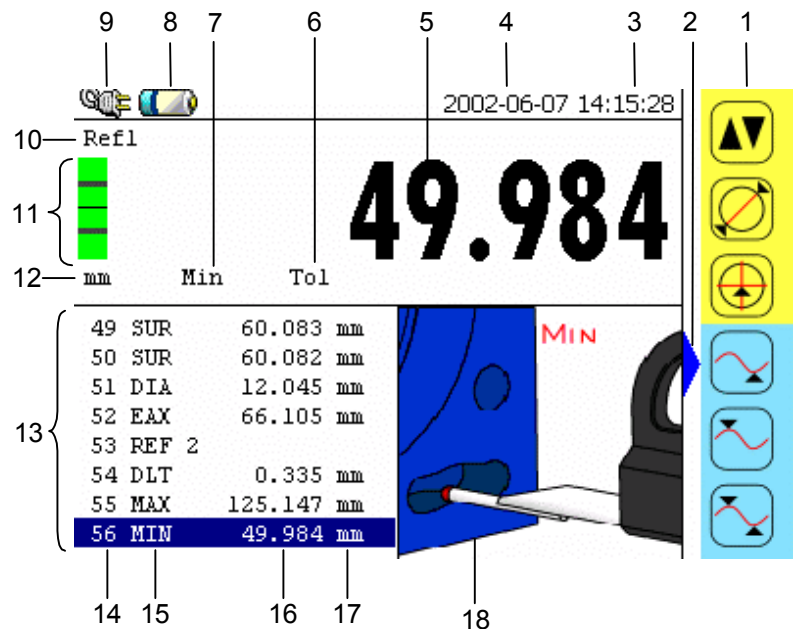
- Neutral position
- Measuring zone (slow movement with a slight stop)
- and Normal displacement speed
- and Progressive fast displacement speed



10.2 Display

Configuration of the "standard" screen:

1. Mode menu
2. Cursor indicating a selected menu
3. Time
4. Date
5. Current measuring value
6. Tolerance limits mode
7. Min, Max or Delta mode
8. Indicator for battery charge
9. Indicator for AC Adaptor connection
10. Active reference
11. Probing indicator
12. Active measurement unit
13. Buffer
14. Numbering of measurements
15. Measurement mode
16. Measured value
17. Measurement unit for the corresponding value
18. Interactive graphic help



Symbols for measuring modes / Buffer

All measurements stored and displayed in the buffer have a 3 letter designation (measuring mode):

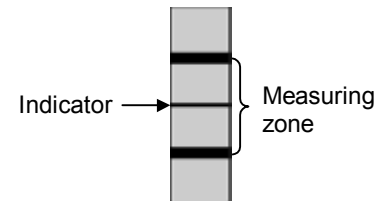
| | |
|------|---|
| ANG | Angle |
| CAL | Calculation of the difference between 2 last values |
| CEN | Centerline distance |
| CST | Probe constant |
| DIA | Diameter |
| DLT | Value in delta mode |
| DST | Distance (when checking squareness) |
| INC | Angle of inclination |
| MAX | Value in Max mode |
| MIN | Value in Min mode |
| PER | Squareness value |
| POS | Current position (no probing) |
| PRE | Preset |
| REC | Rectilinearity |
| REF | Reference |
| SUR | Surface measurement |
| ZERO | Zero setting |

10.3 Probing movement

The accuracy and repeatability of measurements depends on the contact quality of the measuring insert on the part to be measured (⇒probing on surface). The instrument embodies all necessary elements to perform optimum measurement :

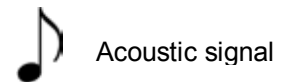
Probing indicator:

Located at the left side of the displayed measuring value, the probing indicator controls the measuring insert position with set measuring force. During a probing movement, the moving line must stay between the 2 marks of the measuring zone (green background). If the measuring zone will be exceeded, the indicator background becomes red.



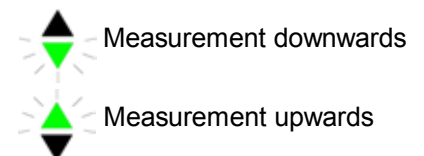
Acoustic signal

An acoustic signal confirms a correct measurement probing movement (measuring force set) and that the value has been stored in the buffer.



Measuring direction arrow

In addition to the acoustic signal, the measurement is confirmed visually by a direction arrow (green LED)



Shock (motorized version)







If the measuring insert has been set with too high speed on a profile or if the measuring zone has been passed (red indication), a shock will be mentioned (text "Collision"). The probe constant and the reference must be rechecked and the measurement repeated.

10.4 Battery pack (operational lifetime, power capacity...)

Battery type: NiMH. They can be charged and discharged at least 500 times before their power capacity will decrease. To optimise the operational lifetime of the battery pack and to allow them to obtain a maximum power capacity, perform at least 5 complete charging cycles when using the instrument initially. Generally, it is recommended to discharge the battery completely before charging again. Do not keep the instrument for a too long period with an empty battery pack.

Level of battery charge:

The level of the battery charge is indicated by a symbol:

- | | |
|---|--|
| 1. 100% available power capacity | 1.  |
| 2. 75% available power capacity | 2.  |
| 3. 50% available power capacity | 3.  |
| 4. 25% available power capacity | 4.  |
| 5. The battery pack must be recharged | 5.  |
| 6. Attention! Not more than 5 minutes autonomous working time is available. | 6.  |

Charging process:

After connection of the charging unit, the corresponding symbol (plug) becomes active and the charge level is animated. The charging process completed, the animation stops and the symbol for the level of battery charge indicates 100% available power capacity.



Use only the charging unit supplied by Trimos to charge the battery pack of the instrument.

10.5 Test of luminous LED's

When switching ON the instrument, the LED's lights up for a short period of time. This is a functional test.

10.6 Measurement with / without air cushion displacement

The use of the air cushion facilitates the displacement of the instrument on the granite plate. The activation of the air cushion lifts the instrument at about 2 µm. The air cushion is not only used for the displacement of the instrument in general but also when performing measurements (e.g. diameters). The main application is found particularly in industrial fields with large heavy parts. Small parts can be moved without activating the air cushion. This allows to significantly increase the autonomy of the instrument.



When using the air cushion displacement for measurement procedures, all functions e.g. zero or preset setting of the display should be done with air cushion to take into consideration the lifting amount of the instrument.

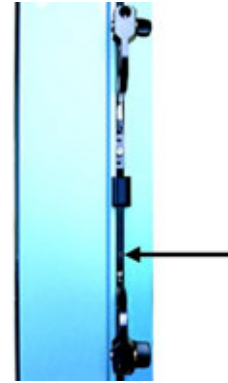
10.7 Reset mode

If the instrument does not work properly, a reset is possible using the **Reset** key located at the rear of the display unit. This key can be reached through an opening by a pin of dia. 1 mm / length of 20 mm.



10.8 Adjustment of the measuring force

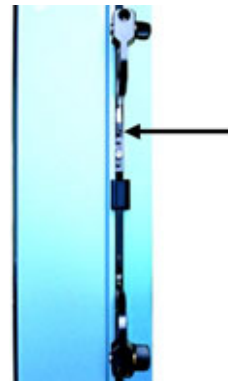
1. The instrument is supplied with a standard measuring setting of 1 N. The measuring force adjustment screw is located inside the column protection profile on the measuring carriage. The screw can be reached through the opening in the protection profile. Use a 2 mm allen key for adjustment. By turning the screw clockwise, the measuring force will be increased.
2. Check the measuring force using a dynamometer (force gage). Bring the dynamometer lever in contact with the measuring insert. Move either the lever or the insert until the sound of the acoustic signal and read the measuring force on the dynamometer. Repeat the same procedure for the opposite movement. Compare the results and re-adjust if necessary. The measuring force must be equal in both directions.



10.9 Adjustment of the floating probe suspension

To guarantee a constant measuring force in both directions (measurement upwards and downwards), adjust the floating probe suspension according to the measuring anvil/ holder used.

1. The screw for the adjustment of the floating probe suspension is located inside the column protection profile on the measuring carriage. The screw can be reached through the opening in the protection profile. Use a 2 mm allen key for adjustment. By turning the screw clockwise, the probing will be relieved. This means, that the measuring force for probing in downwards direction using the standard insert will be lower.
2. To test the floating probe suspension, use a dynamometer. Bring the dynamometer lever in contact with the measuring insert. Move either the lever or the insert until the sound of the acoustic signal and read the measuring force on the dynamometer. Repeat the same procedure for the opposite movement. Compare the two results and re-adjust if necessary. Both directions must be balanced (equal values).

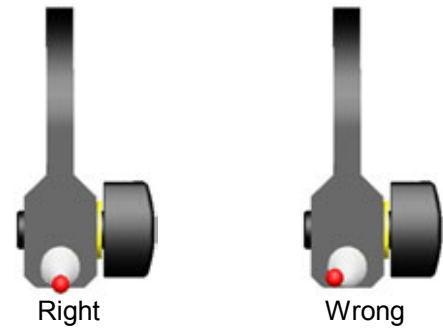


and



10.10 Position of the measuring insert in the holder

Be careful about the position of the measuring insert in the holder. The orientation of the insert is extremely important for a perfect contact of the ball insert on the measuring surface for zero setting.



10.11 Replacing the battery pack

As soon as the autonomy of the instrument becomes unacceptable, change the battery pack:

1. Purchase a new battery pack at your local TRIMOS agent (supplied with the upper plastic protection cover).



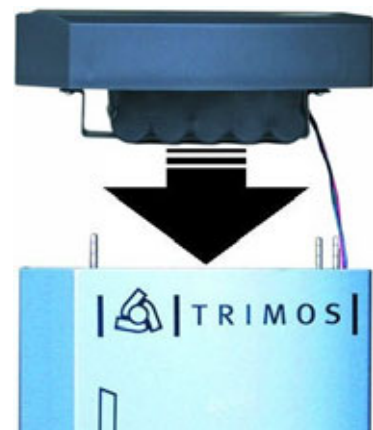
2. Switch the instrument off, disconnect the AC adaptor and remove the upper plastic protection cover.



3. Disconnect the used battery pack and replace it by the new one. To keep the time and date in memory, the instrument should not be disconnected longer than 2 minutes.



4. Put the plastic protection cover back into position. Be careful about the wires, do not squeeze them.



Use only battery packs, corresponding to the instrument type, supplied by TRIMOS.

Dispose of the used battery pack. Care about the environmental standard regulations.

10.12 Temperature variations



Temperature variations can significantly influence the measuring results. To reduce this influence, it is recommended to check and store the probe constant regularly.

11 Maintenance

11.1 Cleaning

The plastic parts, the display unit as well as the painted parts of the instrument should be cleaned using a slightly wet (watered) fabric. Clean the air cushion pads using a clean fabric, slightly soaked with alcohol.

12 Technical specifications

| | | Mestra 300 | Mestra 600 | Mestra 1000 |
|--|------|---|------------|-------------|
| Measuring range | mm | 305 | 610 | 1016 |
| Application range | mm | 567 | 872 | 1278 |
| Max. resolution | mm | 0.0001 | | |
| Max. permissible error | μm | 1.4 + L(mm)/400 | | |
| Repeatability | μm | 0.5 (diameters:1) | | |
| Max. manual displacement speed | mm/s | 1000 | | |
| Max. motorized displacement speed | mm/s | 150 | | |
| Measuring force | N | 0.5 .. 1.8 | | |
| Power supply | | Incorporated battery pack, rechargeable | | |
| Autonomy | h | > 8 | | |
| Overall squareness deviation using probe | μm | 4 | 6 | 10 |
| Data output | | 2 x RS232 C et 2 x USB (A et B) | | |
| Operational temperature | °C | +10 .. +40 | | |
| Storage temperature | °C | -10 .. +40 | | |
| Total height | mm | 645 | 950 | 1357 |
| Weight | kg | 16 | 19 | 23 |

The values of max. permissible error and repeatability are valid only when using the standard probe (measuring insert with tungsten carbide ball, Ø 4 mm, L = 90 mm) at temperature of 20 ± 0.5 °C and relative humidity of 50 ± 5%.

13 After sales service

13.1 Complaints / repairs

In case of problems, please contact your local TRIMOS agent.

For any transport, use the original packing or an adequate one.



The warranty is only valid when it has been checked and signed by the TRIMOS agent.

13.2 Agents

You can find the official TRIMOS agents list on the Internet site : www.trimos.ch

14 Declaration of conformity

DECLARATION DE CONFORMITE KONFORMITÄTSERKLÄRUNG DECLARATION OF CONFORMITY



TRIMOS déclare que les instruments de mesure de hauteur
TRIMOS erklärt, dass die Höhenmessgeräte
TRIMOS declares that the height measuring instruments

Vectra-Touch
Mestra
Mestra-Touch

sont conformes aux directives suivantes :
mit folgenden Richtlinien übereinstimmen :
conforms with the following directives :

CEM / EMV / EMC :

Directive 89/336/EEC

- EN 61000-3-2
- EN 61000-3-3
- EN 61326-1, Class A

FCC Part 15, Subpart B, Class B

Sécurité / Sicherheit / Safety :

Directive 73/23/EEC

- IEC 61010-1